

## Math 12 Foundations: Final Exam Review

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Sokka invested \$500 for 3 years. At the investment's maturity, its value was \$578. What was the annual simple interest rate?

(A) 5.2% B. 4.4% C. 6.2% D. 5.8%

$$A = P(1 + rt)$$

$$578 = 500(1 + r(3))$$

2. Determine the interest earned on a 10-year investment with an interest rate of 5.4%, compounded annually, if the future value is \$80 000.

(A) \$32 719.30 B. \$33 310.31 C. \$33 605.82 D. \$32 837.50

$$A = P(1 + \frac{r}{n})^{nt}$$

$$80000 = P(1 + \frac{0.054}{1})^{10}$$

$i = 0.054$   
 $n = \# \text{ of times per y}$   
 $t = \# \text{ of yrs}$   
 $\text{then } (80000 - P) = \text{int earned}$

3. A 6-year bond has an interest rate of 4.85%, compounded quarterly, and a future value of \$70 000. Determine the ratio of future value to present value.

(A) 1.335 B. 1.263 C. 1.438 D. 1.294

$$70000 = P(1 + \frac{0.0485}{4})^{6 \cdot 4}$$

$$P = 52917.75$$

$$\frac{A}{P} = 1.335$$

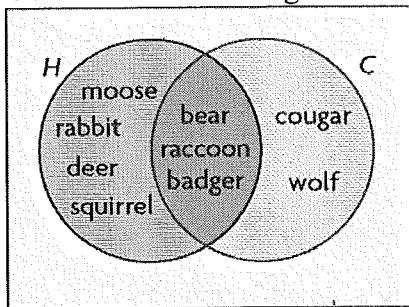
4. Rahim described the set as follows:

- $M = \{\text{all of the foods he eats}\}$
- $D = \{\text{his favourite desserts}\}$
- $V = \{\text{his favourite vegetables}\}$
- $F = \{\text{his favourite fruits}\}$

Which are the disjoint sets?

~~A.  $M$  and  $D$~~  ~~B.  $M$  and  $V$~~  ~~C.  $M$  and  $F$~~  (D.)  $V$  and  $F$

5. Consider the following Venn diagram of herbivores and carnivores:

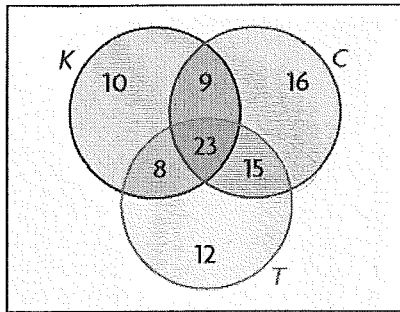


Determine  $H \cap C$ .

- A. {moose, rabbit, deer, squirrel} (B.) {bear, raccoon, badger} C. {cougar, wolf} D. {moose, rabbit, deer, squirrel, bear, raccoon, badger, cougar, wolf}

A

6. A restaurant offers Chinese, Thai, and Korean food. The following Venn diagram shows the types of food the customers like.



$$\overbrace{16 + 9 + 23 + 15}^T = \overbrace{(12 + 8 + 23 + 15)}^T$$

$$= 16 + 9 - 12 - 8$$

$$= 5$$

Use the diagram to determine  $n(C) - n(T)$ .

- (A) 5 B. 4 C. 10 D. 15

D

7. What is a hypothesis?

A. an idea B. a statement C. a clue (D) an assumption

D

8. Which statement is the contrapositive of the conditional statement below?  
"If a balloon is filled with helium, then the balloon will float upwards."

A. If a balloon floats upwards, then the balloon is filled with helium. B. If a balloon is not filled with helium, then the balloon will not float upwards. C. If a balloon is not filled with helium, then the balloon will float downwards. (D) If a balloon does not float upwards, then the balloon is not filled with helium.

C

9. Evaluate.

$$\frac{4! \cdot 7!}{8!}$$

$$\frac{4 \cdot 3 \cdot 2}{8} = 3$$

- A. 0 B. 1 (C) 3 D.  $\frac{1}{3}$

C

10. Suppose a word is any string of letters. How many five-letter words can you make from the letters in KELOWNA if you do not repeat any letters in the word?

$$7 \cdot 6 \cdot 5 \cdot 4 \cdot 3$$

- A. 78 125 B. 16 807 (C) 2520 D. 1250

D

11. How many numbers are there from 900 to 999 that do not have any repeated digits?

- A. 81 B. 90 C. 100 (D) 72

$$\frac{1 \times 9 \times 8}{\uparrow \quad \uparrow \quad \uparrow}$$

9 not 9, and not 0, 1, ..., 8  
What is 2nd spot?

A

12. Solve for  $r$ .

$${}_{15}P_{r-2} = 2730 = 15 \times 14 \times 13$$

- (A)  $r = 5$  B.  $r = 6$  C.  $r = 1$  D.  $r = 3$

$$\frac{15!}{(15-(r-2))!}$$

$$\frac{15!}{(15-r)!}$$

2

$$\text{so need } (15-r)! = 12! \quad \text{so } r = 3$$

- B 13. How many ways can 8 friends stand in a row for a photograph if Molly, Krysta, and Simone always stand together?

A. 1440 B. 4320 C. 5040 D. 2160

$3! \times 5 \times 4 \times 3 \times 2 \times 1 \times 6$   
 here                      here                      here                      here                      here  
 6 spots friends can stand in

- A 14. How many different arrangements can be made using all the letters in CANADA?

A. 120 B. 180 C. 360 D. 720

$\frac{6!}{3!} = 120$   
 duplicate 3!

- A 15. How many different arrangements can be made using all the letters in CALGARY, if the first letter must be G?

A. 360 B. 480 C. 120 D. 720

$\frac{6!}{2!} = 360$   
 duplicate letters

- B 16. A fun fair requires 4 employees to work at the sack bar. There are 13 people available. How many ways can a group of 4 be chosen?

A. 1000 B. 715 C. 635 D. 808

${}^{13}C_4 = \frac{13!}{9!4!} = 715$   
 order doesn't matter

- B 17. Identify the term that best describes the following situation:  
 Determine the number of two-card hands you can be dealt from a standard deck of 52 cards.

A. permutations B. combinations C. factorial D. none of the above

order of 2 cards doesn't matter

- A 18. How many ways can the 6 starting positions on a hockey team (1 goalie, 2 defense, 3 forwards) be filled from a team of 2 goalies, 4 defense, and 7 forwards?

A. 420 B. 500 C. 858 D. 1716

${}^2C_1 \times {}^4C_2 \times {}^7C_3$   
 $\frac{2!}{1!1!} \times \frac{4!}{2!2!} \times \frac{7!}{4!3!} = 420$   
 order of 2 defense doesn't matter etc

- A 19. The odds of Macy passing her driver's test on the first try are 7 : 4. Determine the odds against Macy passing her driver's test.

A. 4 : 7 B. 4 : 11 C. 7 : 11 D. 3 : 11

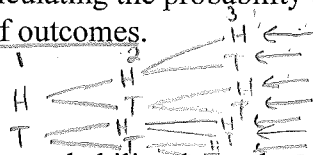
- A 20. From a committee of 18 people, 2 of these people are randomly chosen to be president and secretary. Determine the number of ways in which these 2 people can be chosen for president and secretary.

${}_2P_2$  2 people, 2 positions

A.  ${}_2P_2$  B.  ${}_2P_1$  C.  ${}_{18}P_2$  D.  ${}_{18}P_{16}$

- C 21. Yvonne tosses three coins. She is calculating the probability that at least one coin will land as heads. Determine the total number of outcomes.

A. 2 B. 4 C. 8 D. 16

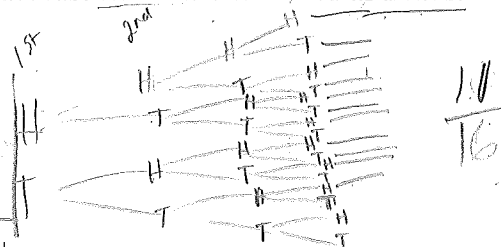


$(or) 2 \times 2 \times 2$

- C 22. Dora tosses four coins. Determine the probability that at least two coins will land as heads.

A. 37.52% B. 46.30% C. 68.75% D. 74.17%

$\frac{11}{16} = \frac{{}^4C_2}{16} + \frac{{}^4C_3}{16} + \frac{{}^4C_4}{16}$   
 2 heads                      3 heads                      4 heads



$\frac{11}{16} = \frac{{}^4C_1}{16} - \frac{{}^4C_0}{16} = \frac{4}{16} - \frac{1}{16} = \frac{11}{16}$   
 1 head                      0 heads

0, 1, 2, 3

total outcomes  
 $2 \times 2 \times 2 \times 2 = 16$

- C 23. Josie is about to draw a card at random from a standard deck of 52 playing cards. Determine the probability that she will draw a red card or a 7.

$26 + 2 \text{ black } 7\text{'s}$

$$\frac{26+2}{52} = \frac{28}{52} = \frac{7}{13}$$

- A.  $\frac{1}{13}$  B.  $\frac{1}{2}$  C.  $\frac{7}{13}$  D.  $\frac{15}{26}$

- D 24. Lorne rolls two regular six-sided dice. Determine the odds against him rolling an odd sum or a 4.

- A. 7 : 11 B. 1 : 8 C. 17 : 19 D. 5 : 7

against for  
15 : 21  
5 : 7

sums  
circled ones  
are for

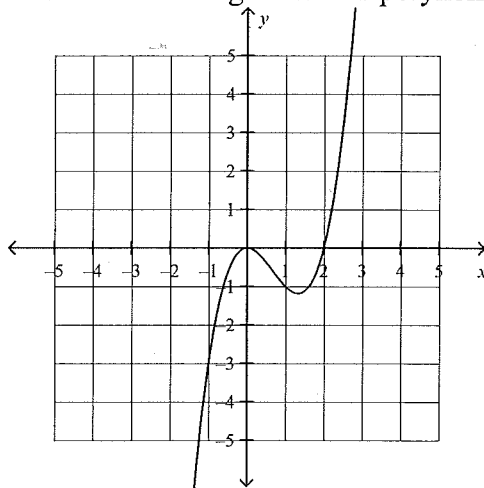
- B 25. A five-colour spinner is spun, and a die is rolled. Determine the probability that you spin yellow and roll a 6.  $\frac{1}{6}$

- A. 2.42% B. 3.33% C. 6.13% D. 7.75%

$$\frac{1}{5} \times \frac{1}{6} = \frac{1}{30}$$

$\frac{1}{5}$

- D 26. Determine the degree of this polynomial function:



$x^2$

$x$

"3"  
graph

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

- A. 0 B. 1 C. 2 D. 3

- B 27. Determine the leading coefficient of this polynomial function:

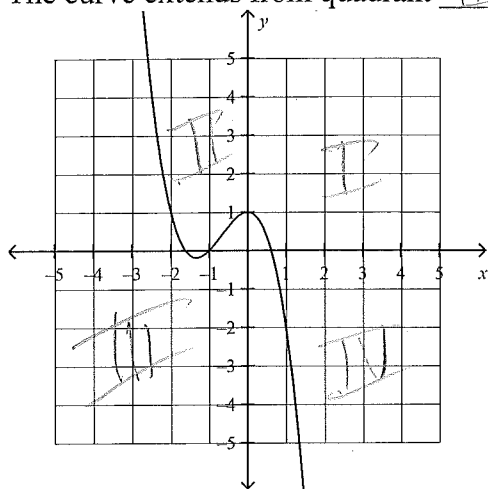
$$f(x) = \frac{3}{4} + 2x$$

coeff of term w largest power

- A.  $\frac{3}{4}$  B. 2 C. 3 D. 4

B

28. Fill in the blanks to describe the end behaviour of this polynomial function:  
The curve extends from quadrant II to quadrant IV.



- A. II; I (B.) II; IV C. III; I D. III; IV

D

29. The average retail price of gas in Canada, from 1979 to 2008, can be modelled by the function  $P(y) = 0.008y^3 - 0.307y^2 + 4.830y + 25.720$  where  $P$  is the price of gas in cents per litre and  $y$  is the number of years after 1979. Determine the average price of gas in 2002.

$$y = 2002 - 1979 = 23$$

- A. 68.8¢/L B. 69.8¢/L C. 70.4¢/L (D.) 71.7¢/L

$$P(23) =$$

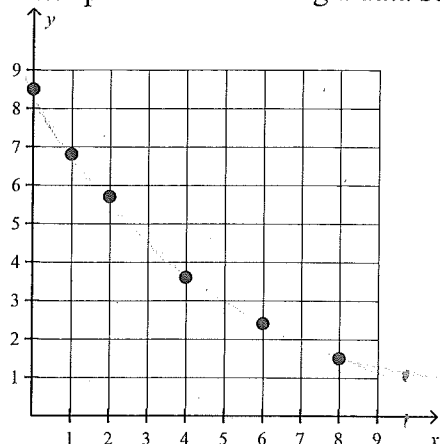
C

30. Which option best describes the behaviour of the exponential function  $g(x) = \frac{1}{2}(10)^x$ ?

$$y = a(b)^x$$

- A. increasing because  $a > 1$  B. decreasing because  $0 < a < 1$  (C.) increasing because  $b > 1$   
D. decreasing because  $0 < b < 1$

- D 31. A scatter plot is drawn using a data set.



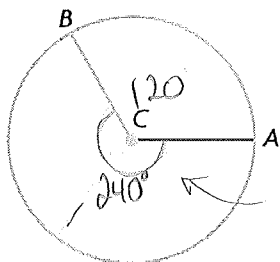
Extrapolate the value of  $y$  when  $x = 10$ .

- A. 1.5 B. -0.3 C. 0.0 D. 1.0

- B 32. The equation of the logarithmic function that models a data set is  $y = 8.2 + 0.7 \ln x$ . Determine the domain of this function.

- A.  $\{x | x \in \mathbb{R}\}$  B.  $\{x | x > 0, x \in \mathbb{R}\}$  C.  $\{x | x > 0.7, x \in \mathbb{R}\}$  D.  $\{x | x > 8.2, x \in \mathbb{R}\}$

- A 33. Choose the best estimate for the central angle (labeled C, the angle arc) in radians.



$2\pi = \text{whole circle}$

$$\frac{2}{3} \times 2\pi = \frac{4\pi}{3} = 4.18879$$

- A 34. Imagine that it is now 2 p.m. What time will it be when the minute hand has rotated through  $1260^\circ$ ?

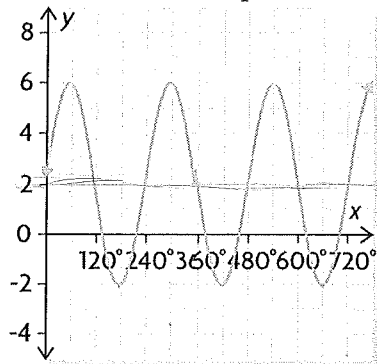
- A. 5:30 B. 4:50 C. 6:00 D. 4:10

$$\begin{array}{r} 1260 \\ - 1080 \\ \hline 180 \end{array} = \text{half an hour}$$

3.5 hours later

C

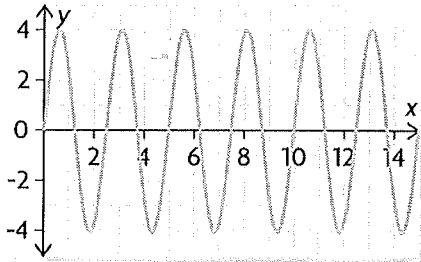
35. Determine the amplitude of the following graph.



- A. 2 B. 3
- C. 4
- D. 5

B

36. Determine the range of the following graph.



- A.
- $\{y \mid -8 \leq y \leq 8, y \in \mathbb{R}\}$
- B.  $\{y \mid -4 \leq y \leq 4, y \in \mathbb{R}\}$
- C.
- $\{y \mid 0 \leq y \leq 15, y \in \mathbb{R}\}$
- D.
- $\{y \mid y \in \mathbb{R}\}$

B

37. Determine the amplitude of the following function.

$$y = 3 \sin 2(x + 90^\circ) - 1$$

- A. 2
- B. 3
- C. 4 D. 5

**Problem**

- The last question on the Final Exam will be a "write your own question and answer it." It will be worth 4 marks (based on creativity, appropriateness, difficulty level of question and accuracy of answer.)